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10/591,954	09/08/2006	Esko I. Kauppinen	3505-1027	8095

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EXAMINER	
MCCRACKEN, DANIEL	

ART UNIT	PAPER NUMBER
1736	

NOTIFICATION DATE	DELIVERY MODE
10/28/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

Office Action Summary	Application No.	Applicant(s)	
	10/591,954	KAUPPINEN ET AL.	
	Examiner	**Art Unit**	
	DANIEL C. MCCRACKEN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 11 August 2010.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 55-79 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 55-79 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Citation to the Specification will be in the following format: (S. # : ¶/L) where # denotes the page number and ¶/L denotes the paragraph number or line number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

Status of Application

The response dated 8/11/2010 has been received and will be entered. Claims 55-79 are pending. Claims 55-79 are currently amended. Claims 1-54 and 80-91 are acknowledged as cancelled.

Response to Arguments

Claim Objections

I. With respect to the objection to Claims 66 and 90-91 under 37 CFR 1.75(c) as being in improper form, the traversal is on the grounds that "Claim 66 has been amended to properly depend upon claim 65" and "Claims 90-91 have been canceled, thus rendering the issue moot." (Remarks of 8/11/2010 at 11). This is persuasive. The objection is WITHDRAWN.

Claim Rejections – 35 U.S.C. §112

I. With respect to the rejection of Claims 72 and 75 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, the traversal is on the grounds that

rejection is obviated by the amendment removing "means plus function" language. This is persuasive. The rejection is WITHDRAWN.

I. With respect to the rejection of Claims 66, 72, 75, 79 and 81-89 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, the traversal is on the grounds that – with respect to Claims 66, 72 and 75, the rejections are obviated by amendment. (Remarks of 8/11/2010 at 12-13). This is persuasive and the rejection of those claims is WITHDRAWN. As to the rejection of Claims 79, Applicants present a definition of a functional limitation. (Remarks of 8/11/2010 at 13). While Applicants state that "functaional language does infer structure to one of skill," no actual traversal of the rejection was presented. "Cite-bites" notwithstanding, this is a general allegation of patentability in violation of 37 C.F.R. 1.111(b). "[A]pparatus claims cover what a device *is*, not what a device *does*." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original). Here, the claim merely recites what it does, not what it is. What structure would "one of skill" infer to this claim? Where is this information in the Specification? The rejection of Claim 79 is MAINTAINED. Those rejections mooted by cancellation are WITHDRAWN.

Claim Rejections – 35 U.S.C. §102

I. With respect to the rejection of Claims 55-59, 63-67, 70, 72-73, 75-76 and 79 under 35 U.S.C. 102(b) as being anticipated by Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 (hereinafter "Kamalakaran at __") in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube*

arrays, Chemcial Physics Letters 2002; 362: 285-290 (hereinafter “Zhang at __”) to show a state of fact, the traversal is apparently on the grounds that "Kamalakaran does not disclose or in any way suggest the separate production of pre-made aerosol catalyst particles and the synthesis of carbon nanotubes in accordance with the present invention.” (Remarks of 8/11/2010 at 16). First, this newly added language is problematic, as it presents a “chicken or the egg” scenario, *i.e.* how does one produce a “pre-made” catalyst particle? This doesn’t make sense. If it’s already “pre-made,” its already produced. Second, the statement in the remarks to the effect that “Kamalakaran discloses the production of catalyst particles *simultaneously* with the carbon nanotubes synthesis" is contrary to the factual record and would appear to be unsupported. The catalyst comes before the nanotube, as suggested by Zhang. Thus, notwithstanding the ambiguities with the new language employed in the claims, Kamalakaran would still appear to teach making “premade” (whatever that means) particles. The rejection is MAINTAINED, updated to address amendments.

II. With respect to the rejection of Claims 55-59, 63-68, 70, 72-76 and 79 under 35 U.S.C. 102(b/e/a) as being anticipate by WO 03/056078 to Dillon, et al. (US 2004/0265211 A1) in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemcial Physics Letters 2002; 362: 285-290 (hereinafter “Zhang at __”) to show a state of fact, the traversal is apparently on the grounds that “no actual catalyst particles are used to synthesize nanotubes.” (Remarks of 8/11/2010 at 18). This was addressed in the office action with the Zhang reference, which Applicants do not address or traverse. This finding is presumed correct. If Dillon does not make “catalyst particles” then how does it make nanotubes? Applicants theory of how Dillon “works” would appear to be contrary to all known nanotube growth mechanisms

(base or tip, *i.e.* "yarmaluke" or skull cap growth mechanisms). The rejection is MAINTAINED, updated to address amendments.

III. With respect to the rejection of Claims 55-61, 63-68, 70, 72-73, 75-77 and 79 under 35 U.S.C. 102(b) as being anticipated by WO 02/076887 to Simard, et al., the traversal is on the grounds that:

> Simard et al. disclose the formation of nanoparticles of metal catalyst via laser ablation and aerosolization and the growth of nanotubes. The features of Simard et al. are not included in the instant independent method claim and the instant independent apparatus claim of the present invention since the feature of "aerosolization from a powder or suspension" has been deleted from these claims.

(Remarks of 8/11/2010 at 20). This has been considered but is not persuasive. The test is not whether features are "included" in the claims, rather the test is whether the features are excluded. *See* MPEP 2111.03 Transitional Phrases (note the open-ended definition of "comprising"). Assuming *arguendo* that all of Applicants characterizations of Simard are correct, they are irrelevant to Claim 55, as Claim 55 is generic to all methods of producing a catalyst particle aerosol. As to Claim 72, similar observations can be made with the new language. Simard is still "configured to produce pre-made (whatever that means) aerosol catalyst particles." The rejection is MAINTIANED, updated to address amendments.

IV. With respect to the rejection of Claims 55-66, 70, 72-73, 75-76 and 79 under 35 U.S.C. 102(b/a) as being anticipated by Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366 (hereinafter "Sato at __"), the traversal is on the grounds that "Sato et al do not disclose a gas phase method for the production of carbon

nanotubes using pre-made aerosol catalyst particles and one or more carbon sources during the formation/synthesis of carbon nanotubes in accordance with instant method claim 55 and instant apparatus claim 72." (Remarks of 8/11/2010 at 22). This is a general allegation of patentability, and furthermore does not make sense when read in view of the previous paragraph on page 21 of the remarks. In that paragraph, Applicants state that "Sato et al disclose . . . the production of pre-made catalyst particles . . . Then the substrate with the pre-made catalyst particles . . . is transferred to a CVD chamber where the growth of the carbon nanotubes takes place." Clearly, Applicants agree that catalyst particles and made and a CVD process (i.e. one that uses a carbon source) takes place. These remarks were not understood. Again, the claims are generic to a host of nanotube processes. The claims do not exclude a substrate, etc. Read the definition of "comprising" cited *supra*. The rejection is MAINTAINED, updated to address amendments.

Claim Rejections – 35 U.S.C. §103

I. With respect to the rejection of Claims 80-82, 85 and 86-89 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemcial Physics Letters 2002; 362: 285-290 (hereinafter "Zhang at __") to show a state of fact, this rejection is mooted by cancellation and WITHDRAWN.

II. With respect to the rejection of Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 in view of Zhang, et al., *Rapid*

growth of well-aligned carbon nanotube arrays, Chemcial Physics Letters 2002; 362: 285-290 to show a state of fact as applied to claim 55 above, and further in view of (i) Maruyama, et al., *Low-temperature synthesis of high-purity single-walled carbon nanotubes from alcohol*, Chemical Physics Letters 2002; 360: 229-334 (hereinafter "Maruyama at __"), this rejection was not specifically traversed, nor was Maruyama addressed. It is assumed the analysis was correct. The rejection is MAINTAINED, updated to address amendments.

III. With respect to the rejection of Claim 69 and 83-84 under 35 U.S.C. 103(a) as being unpatentable over Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemcial Physics Letters 2002; 362: 285-290 to show a state of fact as applied to claim 55 above, and further in view of: (i) Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"), (ii) US 6,426,134 to Lavin, et al., and (iii) US 6,599,961 to Pienkowski, et al., this rejection was not specifically traversed, nor were the Thostenson, Lavin or Pienkowski references addressed. It is assumed the analysis was correct. The rejection of Claim 69 is MAINTAINED. The rejection of Claims 83-84 is mooted by cancellation and WITHDRAWN.

IV. With respect to the rejection of Claim 71 under 35 U.S.C. 103(a) as being unpatentable over Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemical Physics Letters 2002; 362: 285-290 to show a state of fact as applied to claim 55 above, and further in view of: (i) Vivekchand, et al.,

Carbon nanotubes by nebulized spray pyrolysis, Chemical Physics Letters 2004; 386: 313-318 (hereinafter "Vivekchand at __"), this rejection was not specifically traversed, nor was the Vivekchand reference addressed. It is assumed the analysis was correct. The rejection is MAINTAINED, updated to address amendments.

V. With respect to the rejection of Claims 80-82 and 85-89 under 35 U.S.C. 102(b/e/a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over WO 03/056078 to Dillon, et al. (US 2004/0265211 A1) in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemical Physics Letters 2002; 362: 285-290 to show a state of fact, this rejection is mooted by cancellation and WITHDRAWN.

VI. With respect to the rejection of Claim 69 and 83-84 under 35 U.S.C. 103(a) as being unpatentable over WO 03/056078 to Dillon, et al. (US 2004/0265211 A1) in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemical Physics Letters 2002; 362: 285-290 to show a state of fact as applied to claim 55 above, and further in view of: (i) Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"), (ii) US 6,426,134 to Lavin, et al., and (iii) US 6,599,961 to Pienkowski, et al., this rejection was not specifically traversed, nor were the Thostenson, Lavin or Pienkowski references addressed. It is assumed the analysis was correct. The rejection of Claim 69 is MAINTAINED. The rejection of Claims 83-84 is mooted by cancellation and WITHDRAWN.

VII. With respect to the rejection of Claim 71 under 35 U.S.C. 103(a) as being unpatentable over WO 03/056078 to Dillon, et al. (US 2004/0265211 A1) in view of Zhang, as applied to claim 55 above, and further in view of: (i) Vivekchand, et al., *Carbon nanotubes by*

nebulized spray pyrolysis, Chemical Physics Letters 2004; 386: 313-318 (hereinafter "Vivekchand at __"), this rejection was not specifically traversed, nor was the Vivekchand reference addressed. It is assumed the analysis was correct. The rejection is MAINTAINED, updated to address amendments.

VIII. With respect to the rejection of Claims 80-82 and 85-89 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over WO 02/076887 to Simard, et al, the rejection is mooted by cancellation and WITHDRAWN.

IX. With respect to the rejection of Claim 69 and 83-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/076887 to Simard, et al. as applied to claim 55 above, and further in view of: (i) Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"), (ii) US 6,426,134 to Lavin, et al., and (iii) US 6,599,961 to Pienkowski, et al., this rejection was not specifically traversed, nor were the Thostenson, Lavin or Pienkowski references addressed. It is assumed the analysis was correct. The rejection of Claim 69 is MAINTAINED. The rejection of Claims 83-84 is mooted by cancellation and WITHDRAWN.

X. With respect to the rejection of Claims 80-82 and 85-89 under 35 U.S.C. 102(b/a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366, this rejection is mooted by cancellation and WITHDRAWN.

XI. With respect to the rejection of Claims 71 and 77-78 under 35 U.S.C. 103(a) as being unpatentable over Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366, this rejection was not addressed/traversed. The rejection is presumed proper and MAINTAINED, updated to address amendments.

XII. With respect to the rejection of Claims 66-68 under 35 U.S.C. 103(a) as being unpatentable over Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366 in view of (i) Maruyama, et al., *Low-temperature synthesis of high-purity single-walled carbon nanotubes from alcohol*, Chemical Physics Letters 2002; 360: 229-334, this rejection was not specifically traversed nor was the Maruyama reference addressed. It is assumed the analysis was correct. The rejection is MAINTAINED, updated to address amendments.

XIII. With respect to the rejection of Claim 69 under 35 U.S.C. 103(a) as being unpatentable over Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366 as applied to claim 55 above, and further in view of: (i) Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"), (ii) US 6,426,134 to Lavin, et al., and (iii) US 6,599,961 to Pienkowski, et al., this rejection was not specifically traversed, nor were the Thostenson, Lavin or Pienkowski references addressed. It is assumed the analysis was correct. The rejection of Claim 69 is MAINTAINED.

XIV. With respect to the rejection of Claims 80-81 and 85 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bandyopadhyaya, et al., *Stabilization of Individual Carbon Nanotubes in Aqueous Solutions*, Nano Letters 2002; 2(1): 25-28, this rejection is mooted by cancellation and WITHDRAWN.

XV. With respect to the rejection of Claims 80 and 82-85 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"), this rejection is mooted by cancellation and WITHDRAWN..

XVI. With respect to the rejection of Claims 80 and 82-85 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US 6,426,134 to Lavin, et al. , this rejection is mooted by cancellation and WITHDRAWN.

XVII. With respect to the rejection of Claims 80 and 82-85 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US 6,599,961 to Pienkowski, et al. , this rejection is mooted by cancellation and WITHDRAWN.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

I. Claims 55-79 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to Claim 55 and Claim 72, these claims both recite some manner of producing "pre-made" catalyst particles. This language is contradictory, and as noted above, presents a "chicken-or-egg" scenario. Which is first - the catalyst particle or producing it? If it's "pre-made," then does the claim actually require producing it? Was it made by someone else, then purchased? Is the claim infringed by using another suppliers pre-made catalyst particle in some generic process? Any number of issues are raised by this language. It obscures what is required by the claims. All dependent claims not specifically addressed import the issues associated with the independent claims from which they depend.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

I. Claims 55-59, 63-67, 70, 72-73, 75-76 and 79 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 (hereinafter "Kamalakaran at __") in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemcial Physics Letters 2002; 362: 285-290 (hereinafter "Zhang at __") to show a state of fact.

With respect to Claim 55 - and notwithstanding the newly introduced ambiguities in the claims - this claim requires "producing catalyst particles by physical vapor nucleation of catalyst material or by solution droplet thermal decomposition of catalyst precursor or by aerosolization from a powder or suspension." Kamalakaran teaches forming an aerosol of catalyst material from a precursor. (Kamlakaran at 3385, col. 2; "Fig. 1"). Heating of the ferrocene is recognized in the art as making catalyst particles. The evidence provided is Zhang. *See* (Zhang at 286, col. 2)

("Ferrocene acts as a producer for Fe catalyst particles."). Note that, with respect to the Zhang reference, multiple reference 102 rejections are in fact permissible. *See* MPEP 2131.01. Claim 55 further requires "using said catalyst particles and one or more carbon sources in a reactor to produce carbon nanotubes." Kamalakaran teaches thermally decomposing a carbon source (benzene) to make nanotubes. *See e.g.* (Kamalakaran at 3385, col. 1). This is all that the claim requires and note that the claim does not exclude a spray pyrolysis method. The catalyst particle is formed and the nanotube is then grown. (Kamalakaran at 3387, col. 1). As to Claim 56, the catalyst precursor (ferrocene) contains a metal (iron). (Kamalakaran at 3385, "Fig. 1"). As to Claim 57, Kamalakaran teaches evaporation of the catalyst by a radiatively heated metal or alloy, *i.e.* the furnace. (Kamalakaran at 3385, col. 2). As to Claim 58, radiative heat transfer occurs from the furnace to the tube. *Id*. As to Claim 59, heating of the ferrocene decomposes to form catalyst particles. Carbon nanotubes are then formed. See discussion of Claim 55. As to Claim 63-64, benzene is taught. (Kamalakaran at 3385, col. 1). As to Claim 65-66, Kamalakaran discloses using another reagent, acetone. (Kamalakaran at 3385, col. 2). As to Claim 67, this claim recites numerous "and/or" clauses. The claim, *by virtue of the way it was written*, can be interpreted in numerous ways. The Examiner, for purposes of this rejection, is interpreting Claim 67 as only requiring purification of the amorphous carbon. Stated differently, the Examiner is interpreting the claim disjunctively. Kamalakaran teaches reacting the reagent (acetone) with the amorphous carbon/soot to purify the nanotubes. (Kamalakaran at 3385, col. 2). As to Claim 70, the temperature is controlled. *Id.*

With respect to Claim 72 - and notwithstanding the newly introduced ambiguities in the claims - this claim requires "a device configured to produce pre-made catalyst particles by

physical vapor nucleation of catalyst material or by solution droplet thermal decomposition of catalyst precursor." Kamalarakaran teaches means for producing catalyst particles. (Kamalarakaran "Fig. 1"). Claim 72 further requires "one or more reactors for producing carbon nanotubes using said catalyst particles and one or more carbon sources." A reactor is taught. *Id*. As to Claim 73, a "pre-reactor" is taught. (Kamalakaran "Fig. 1") (note container for benzene/ferrocene). As to Claim 75, Kamalarakaran teaches a source for supplying energy to the reactor. *Id*. (furnace). As to Claim 76, the means for producing the catalyst particle contains ferrocene, *i.e.* material included in one or more catalyst particles. *Id*. As to Claim 79, wall temperature is controlled. *Id*.

II. Claims 55-59, 63-68, 70, 72-76 and 79 are rejected under 35 U.S.C. 102(b/e/a) as being anticipate by WO 03/056078 to Dillon, et al. (US 2004/0265211 A1) in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemcial Physics Letters 2002; 362: 285-290 (hereinafter "Zhang at __") to show a state of fact.

Note that Dillon is applicable under various sections of the statute. The instant application draws priority from an international application with a filing date of 3/9/2005. The Dillon WIPO document was published on 7/10/2003. As such, Dillon is 102(b) art against the international filing date. Should applicants perfect their foreign priority (by filing a translation, etc. - *see e.g.* 35 U.S.C. 119(b)(3)) and be accorded their Finland filing date of 3/9/2004, the Dillon reference is applicable under 102(a). Note also that the corresponding US pre-grant publication is available under 35 U.S.C. 102(e). For brevity's sake, reference shall be made to the WIPO publication, although Applicants should be aware of the US PGPUB, etc. The same rejection over the US PGPUB is applicable, *mutatis mutandis*. Finally, with respect to the Zhang reference, note that multiple reference 102 rejections are permissible. *See* MPEP 2131.01.

With respect to Claim 55 - and notwithstanding the newly introduced ambiguities in the claims - this claim requires “producing catalyst particles by physical vapor nucleation of catalyst material or by solution droplet thermal decomposition of catalyst precursor or by aerosolization from a powder or suspension.” Dillon teaches physical vapor nucleation of a catalyst. *See* (Dillon 5: 5-12). Note that Dillon employs a hot wire, the same technique disclosed in Applicants specification at (S. 3: 17). Note that while Dillon does not state *in haec verba* “producing catalyst particles,” it is recognized in the art that heating ferrocene (the catalyst material disclosed by Dillon) will decompose into catalyst particles, and therefore this is an expected or inherent feature of Dillon by virtue of heating the ferrocene. The evidence provided is Zhang. *See* (Zhang at 286, col. 2) ("Ferrocene acts as a producer for Fe catalyst particles."). Claim 55 further requires “using said catalyst particles and one or more carbon sources in a reactor to produce carbon nanotubes.” Dillon teaches producing nanotubes with the catalyst. *See e.g.* (Dillon 5: 9-12). As to Claim 56, Dillon teaches ferrocene, which contains iron. (Dillon 5: 18). *See also* (Dillon 10: 17-27). As to Claim 57, resistively heated wires are taught. *See e.g.* (Dillon 5: 5). As to Claim 58, Dillon teaches heat transfer that is conductive (in the case where the ferrocene contacts the hot wire) and radiative (in the case where ferrocene doesn’t contact the wire). *See generally* (Dillon 5: 5-18). As to Claim 59, the particle is produced before (albeit slightly before) the nanotube is grown. See discussion of Claim 55. As to Claim 63, carbon sources are taught. (Dillon 16: 10) (methane carbon precursor). As to Claim 64, methane is taught. *Id*. As to Claim 65, at least one or more reagents are taught. *See generally* (Dillon 16: 1 *et seq*.) (Example 1, note addition of hydrogen, methane and ferrocene). As to Claim 66, and notwithstanding the ambiguities noted elsewhere, the reagents at least participate in a reaction with the catalyst to

form a nanotube. *Id*. As to Claim 67, for purposes of this rejection the claim is interpreted disjunctively and as only requiring the reaction with the catalyst to form nanotubes. Dillon teaches this. *See Id*. As to Claim 68, hydrogen is taught. (Dillon 16: 3). As to Claim 70, the presence of a power supply (Dillon "Fig. 1") and recitation of "maintaining" a temperature suggests at least temperature control. *See e.g.* (Dillon 16: 9-20).

With respect to Claim 72 - and notwithstanding the newly introduced ambiguities in the claims - this claim requires "a device configured to produce pre-made catalyst particles by physical vapor nucleation of catalyst material or by solution droplet thermal decomposition of catalyst precursor." Dillon teaches physical vapor nucleation of a catalyst. *See* (Dillon 5: 5-12). Note that Dillon employs a hot wire, the same technique disclosed in Applicants specification at (S. 3: 17). Claim 72 further requires "one or more reactors for producing carbon nanotubes using said catalyst particles and one or more carbon sources." Dillon teaches a reactor. *See e.g.* (Dillon "Fig. 1"). As to Claim 73, a reactor is taught. (Dillon "Fig. 1"). As to Claim 74, a hot wire generator is taught. (Dillon 5: 5-12). As to Claim 75, Dillon teaches at least a "source supplying energy to said means for producing catalyst particles." (Dillon "Fig. 1") (Power Supply). As to Claim 76, the means for producing the catalyst particles disclosed by Dillon, namely the ferrocene supply taught at *e.g.* (Dillon 5: 8) contains material included in one or more catalyst particles, namely iron. As to Claim 79, notwithstanding the ambiguities noted above, Dillon teaches controlling wall temperature by adding multiple hot filaments. *See e.g.* (Dillon "Fig. 4").

III. Claims 55-61, 63-68, 70, 72-73, 75-77 and 79 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 02/076887 to Simard, et al.

With respect to Claim 55 - and notwithstanding the newly introduced ambiguities in the claims - this claim requires “producing catalyst particles by physical vapor nucleation of catalyst material or by solution droplet thermal decomposition of catalyst precursor or by aerosolization from a powder or suspension.” Simard teaches formation of nanoparticles of the metal catalyst via laser ablation and aerosolization. (Simard 5: 11; “Fig. 2”)). Claim 55 further requires “using said catalyst particles and one or more carbon sources in a reactor to produce carbon nanotubes.” Simard teaches growth of nanotubes. *See e.g.* (Simard 11: 7) (“Example 2 – Formation of Nanotubes”). As to Claim 56, metals are taught. *Id*. (“Co:Mo metal”). As to Claim 57, at least laser ablation is taught. *Id*. (“The metal is exposed to a YAG laser”). As to Claim 58, radiative heat transfer is taught. *See e.g.* (Simard 9: 5; “Fig. 2”) (discussing furnace). As to Claim 59, catalyst particles are produced before nanotube growth. *See e.g.* (Simard 11: 7) (“Example 2 – Formation of Nanotubes”). As to Claim 60-61, Simard teaches forming a desired level of metal content in solution, *i.e.* classifing by mass or solubility. (Simard 12: 4). Note also classification by size taught at e.g. (Simard 10: 4) (describing a filter). As to Claim 63, hydrocarbons are taught. (Simard 10: 4) (“hydrocarbon solution”).As to Claim 64, toluene is taught. (Simard 11: 7). As to Claim 65, multiple reagents are taught. *See e.g. Id*. As to Claim 66-67, notwithstanding ambiguities noted elsewhere, a chemical reaction with catalyst precursors to make nanotubes is taught. *See e.g. Id*. As to Claim 68, hydrogen is taught. (Simard 8: 3). As to Claim 70, the reactor as show has a residence time that can be controlled by controlling the feedstock rate, taught at (Simard 10: 2; “Fig. 2”).

With respect to Claim 72 - and notwithstanding the newly introduced ambiguities in the claims - this claim requires “a device configured to produce pre-made catalyst particles by

physical vapor nucleation of catalyst material or by solution droplet thermal decomposition of catalyst precursor." Simard teaches means for producing catalyst particles by laser ablation. *See e.g.* (Simard 10: 1; "Fig. 2"). Claim 72 further requires "one or more reactors for producing carbon nanotubes using said catalyst particles and one or more carbon sources." A reactor is taught. *Id*. As to Claim 73, a pre-reactor (comprising the laser/target, etc.) is taught. (Simard "Fig. 2"). As to Claim 75, at least a particle classifier is taught. (Simard 10: 4) (filter). As to Claim 76, the means for producing the particles have material include in the catalyst. *See e.g.* (Simard 10: 1) ("bulk metal catalyst"). As to Claim 79, the reactor has a length. (Simard "Fig. 2").

IV. Claims 55-66, 70, 72-73, 75-76 and 79 are rejected under 35 U.S.C. 102(b/a) as being anticipated by Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366 (hereinafter "Sato at __").

With respect to Claim 55 - and notwithstanding the newly introduced ambiguities in the claims - this claim requires "producing catalyst particles by physical vapor nucleation of catalyst material or by solution droplet thermal decomposition of catalyst precursor or by aerosolization from a powder or suspension." Sato teaches vaporizing a nickel catalyst material. (Sato at 362, col 2 & "Fig. 1"). Claim 55 further requires "using said catalyst particles and one or more carbon sources in a reactor to produce carbon nanotubes." Nanotubes are produced. (Sato at 363, col. 2). As to Claim 56, nickel is taught. (Sato at 362, col 2 & "Fig. 1"). As to Claim 57, laser ablation is taught. *Id*. As to Claim 58, the helium cools the particles. *Id*. As to Claim 59, the particles are produced before making nanotubes. (Sato at 363, col. 2). As to Claims 60-62, the particles are size classified with a differential mobility analyzer. (Sato at 362, col. 2) ("2. experimental"). As

to Claims 63-64, acetylene (a hydrocarbon) is taught. (Sato at 363, col. 1). As to Claims 65-66, argon participates in the reaction. *Id*. As to Claim 70, at least temperature is controlled. *Id*.

With respect to Claim 72 - and notwithstanding the newly introduced ambiguities in the claims - this claim requires "a device configured to produce pre-made catalyst particles by physical vapor nucleation of catalyst material or by solution droplet thermal decomposition of catalyst precursor." Sato teaches a laser ablation apparatus. (Sato at 362, col 2 & "Fig. 1"). Claim 72 further requires "one or more reactors for producing carbon nanotubes using said catalyst particles and one or more carbon sources." A reactor is taught. (Sato at 363, col. 1) ("CVD chamber"). As to Claim 73, "pre-reactors" are taught. (Sato at 362, col 2 & "Fig. 1"). As to Claim 75, at least a particle classifier is taught. *Id*. As to Claim 76, the "means for producing" the catalyst contains nickel, which is included in the catalyst particle. *Id*. As to Claim 79, temperature is controlled. (Sato at 363, col. 1).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

I. Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemcial Physics Letters 2002; 362: 285-290 to show a state of fact as applied to claim 55 above, and further in view of:

(i) Maruyama, et al., *Low-temperature synthesis of high-purity single-walled carbon nanotubes from alcohol*, Chemical Physics Letters 2002; 360: 229-334 (hereinafter "Maruyama at __").

The discussion of Claim 55 accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. As to Claim 68, to the extent Kamalakaran *may* not disclose employing the reagents as claimed, these are known in the art. The Examiner takes official notice that they are. In support of taking official notice (*i.e.* in making sure there is substantial evidence on the record), the Examiner provides Maruyama (teaching alcohols at *e.g.* Maruyama at 230, col. 1). One would be motivated to employ an alcohol as a substitute for the hydrocarbon of Kamalakaran, as Maruyama teaches that alcohols reduce amorphous carbon formation and produce high purity carbon nanotubes. (Maruyama at 230, col. 1). Note also that alcohols provide for lower temperature synthesis, which suggests lower energy costs. *Id*.

II. Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemcial Physics Letters 2002; 362: 285-290 to show a state of fact as applied to claim 55 above, and further in view of:

(i) Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"),

(ii) US 6,426,134 to Lavin, et al., and

(iii) US 6,599,961 to Pienkowski, et al.

The discussion of Claim 55 accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. As to Claim 69, to the extent Kamalakaran *may* not disclose the addition of an additive to create a composite, this does not impart patentability. Composites containing carbon nanotubes are old and known, and the Examiner takes official notice that they are. In support of taking official notice (*i.e.* in making sure there is substantial evidence on the record), the Examiner provides Thostenson, Lavin and Pienkowski. *See e.g.* (Thostenson at 1907, col. 2 *et seq.*)(discussing nanotube composites), (Lavin 2: 25 *et seq*) (discussing nanotube

composites) *and* (Pienkowski 4: 10 *et seq.*) (discussing PMMA nanotube composites). A post-growth processing step of making a composite is well within the skill in the art as demonstrated from the references of record, and such a step appears to be mere combination of known elements to obtain predictable results. This does not impart patentability. *See* MPEP 2143. Furthermore, note the various teachings, suggestions and motivations in the documents, for example the known properties of carbon nanotubes. *See e.g.* (Pienkowski at 1907, col. 2) ("The reported exceptional properties of nanotubes have motivated others to investigate experimentally the mechanics of nanotube-based composite films.").

III. Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamalakaran, *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemical Physics Letters 2002; 362: 285-290 to show a state of fact as applied to claim 55 above, and further in view of:

(i) Vivekchand, et al., *Carbon nanotubes by nebulized spray pyrolysis*, Chemical Physics Letters 2004; 386: 313-318 (hereinafter "Vivekchand at __").

The discussion of Claim 55 accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. As to Claim 71, to the extent Kamalakaran *may* not disclose the addition of multiple catalyst supplies, this does not impart patentability. Vivekchand employs multiple catalyst sources, and they give rise to isolated SWNTs. (Vivekchand at 317, col. 2) ("Pyrolysis of cobaltocene and nickelocene in mixture with toluene gave isolated SWNTs."). One would be motivated to employ multiple catalysts as taught by Vivekchand to make isolated SWNTs versus MWNTs, etc.

IV. Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/056078 to Dillon, et al. (US 2004/0265211 A1) in view of Zhang, et al., *Rapid growth of well-aligned carbon nanotube arrays*, Chemical Physics Letters 2002; 362: 285-290 to show a state of fact as applied to claim 55 above, and further in view of:

(i) Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"),

(ii) US 6,426,134 to Lavin, et al., and

(iii) US 6,599,961 to Pienkowski, et al.

The discussion of Claim 55 accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. As to Claim 69, to the extent Dillon *may* not disclose the addition of an additive to create a composite, this does not impart patentability. Composites containing carbon nanotubes are old and known, and the Examiner takes official notice that they are. In support of taking official notice (*i.e.* in making sure there is substantial evidence on the record), the Examiner provides Thostenson, Lavin and Pienkowski. *See e.g.* (Thostenson at 1907, col. 2 *et seq.*)(discussing nanotube composites), (Lavin 2: 25 *et seq*) (discussing nanotube composites) *and* (Pienkowski 4: 10 *et seq.*) (discussing PMMA nanotube composites). A post-growth processing step of making a composite is well within the skill in the art as demonstrated from the references of record, and such a step appears to be mere combination of known elements to obtain predictable results. This does not impart patentability. *See* MPEP 2143. Furthermore, note the various teachings, suggestions and motivations in the documents, for example the known properties of carbon nanotubes. *See e.g.* (Pienkowski at 1907, col. 2) ("The reported exceptional properties of nanotubes have motivated others to investigate experimentally the mechanics of nanotube-based composite films.").

V. Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/056078 to Dillon, et al. (US 2004/0265211 A1) in view of Zhang, as applied to claim 55 above, and further in view of:

(i) Vivekchand, et al., *Carbon nanotubes by nebulized spray pyrolysis*, Chemical Physics Letters 2004; 386: 313-318 (hereinafter "Vivekchand at __").

The discussion of Claim 55 accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. As to Claim 71, to the extent Dillon *may* not disclose the addition of multiple catalyst supplies, this does not impart patentability. Vivekchand employs multiple catalyst sources, and they give rise to isolated SWNTs. (Vivekchand at 317, col. 2) ("Pyrolysis of cobaltocene and nickelocene in mixture with toluene gave isolated SWNTs."). One would be motivated to employ multiple catalysts as taught by Vivekchand to make isolated SWNTs versus MWNTs, etc. Note also that Dillon explicitly provides for "a wide range of gas delivery systems," etc. (Dillon 10: 13).

VI. Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/076887 to Simard, et al. as applied to claim 55 above, and further in view of:

(i) Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"),

(ii) US 6,426,134 to Lavin, et al., and

(iii) US 6,599,961 to Pienkowski, et al.

The discussion of Claim 55 accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. As to Claim 69, to the extent Simard *may* not disclose the addition of an additive to create a composite, this does not impart patentability. Composites containing carbon nanotubes are old and known, and the Examiner takes official notice that they are. In support of taking official notice (*i.e.* in making sure there is substantial evidence on the record), the Examiner provides Thostenson, Lavin and Pienkowski. *See e.g.* (Thostenson at 1907,

col. 2 *et seq.*)(discussing nanotube composites), (Lavin 2: 25 *et seq*) (discussing nanotube composites) *and* (Pienkowski 4: 10 *et seq.*) (discussing PMMA nanotube composites). A post-growth processing step of making a composite is well within the skill in the art as demonstrated from the references of record, and such a step appears to be mere combination of known elements to obtain predictable results. This does not impart patentability. *See* MPEP 2143. Furthermore, note the various teachings, suggestions and motivations in the documents, for example the known properties of carbon nanotubes. *See e.g.* (Pienkowski at 1907, col. 2) ("The reported exceptional properties of nanotubes have motivated others to investigate experimentally the mechanics of nanotube-based composite films.").

VII. Claims 71 and 77-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366.

The discussion of Sato accompanying the anticipation rejection ("Rejection IV") *supra* is expressly incorporated herein by reference. As to Claim 71, this claim requires two or more catalyst particle suppliers. Sato appears to disclose only one. One would be motivated to add at least catalyst supplier to scale up the process and accommodate more catalyst formation and placement on the substrate, etc. As to Claim 77 this claim requires two or more pre-reactors. Sato appears to disclose only one pre-reactor. One would be motivated to add at least another pre-reactor to scale up the process and accommodate more catalyst formation and placement on the substrate, etc. Note also that duplication of parts does not impart patentability. MPEP 2144.04 VI. B. Likewise, with respect to Claim 78, operating two reactors in parallel to create nanotubes with different diameters is within the skill in the art, as demonstrated by Sato.

VIII. Claims 66-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366 in view of (i) Maruyama, et al., *Low-temperature synthesis of high-purity single-walled carbon nanotubes from alcohol*, Chemical Physics Letters 2002; 360: 229-334.

The discussion of Claim 55 accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. As to Claim 66-68, to the extent Sato *may* not disclose employing the reagents as claimed, these are known in the art. The Examiner takes official notice that they are. In support of taking official notice (*i.e.* in making sure there is substantial evidence on the record), the Examiner provides Maruyama (teaching alcohols at *e.g.* Maruyama at 230, col. 1). One would be motivated to employ an alcohol as a substitute for the hydrocarbon of Sato, as Maruyama teaches that alcohols reduce amorphous carbon formation and produce high purity carbon nanotubes. (Maruyama at 230, col. 1). Note also that alcohols provide for lower temperature synthesis, which suggests lower energy costs. *Id.*

IX. Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato, et al., *Growth of diameter-controlled carbon nanotubes using monodisperse nickel nanoparticles obtained with a differential mobility analyzer*, Chemical Physics Letters 2003; 382: 361-366 as applied to claim 55 above, and further in view of:

(i) Thostenson, *Advances in the science and technology of carbon nanotubes and their composites: a review*, Composite Science and Technology 2001; 61: 1899-1912 (hereinafter "Thostenson at __"),

(ii) US 6,426,134 to Lavin, et al., and

(iii) US 6,599,961 to Pienkowski, et al.

The discussion of Claim 55 accompanying the anticipation rejection *supra* is expressly incorporated herein by reference. As to Claim 69, to the extent Sato *may* not disclose the addition of an additive to create a composite, this does not impart patentability. Composites containing carbon nanotubes are old and known, and the Examiner takes official notice that they are. In

support of taking official notice (*i.e.* in making sure there is substantial evidence on the record), the Examiner provides Thostenson, Lavin and Pienkowski. *See e.g.* (Thostenson at 1907, col. 2 *et seq.*)(discussing nanotube composites), (Lavin 2: 25 *et seq*) (discussing nanotube composites) *and* (Pienkowski 4: 10 *et seq.*) (discussing PMMA nanotube composites). A post-growth processing step of making a composite is well within the skill in the art as demonstrated from the references of record, and such a step appears to be mere combination of known elements to obtain predictable results. This does not impart patentability. *See* MPEP 2143. Furthermore, note the various teachings, suggestions and motivations in the documents, for example the known properties of carbon nanotubes. *See e.g.* (Pienkowski at 1907, col. 2) ("The reported exceptional properties of nanotubes have motivated others to investigate experimentally the mechanics of nanotube-based composite films."). As to Claims 83-84, these claims are product-by-process claims. They depend from Claim 80, which requires carbon nanotubes. Nanotubes are taught. *See e.g.* (Simard "Fig. 8"). Claims 83-84 recite the product resulting from the combination of the known processes taught in Sato, Thostenson, Lavin and Pienkowski.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL C. MCCRACKEN whose telephone number is (571)272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel C. McCracken/
Daniel C. McCracken
Examiner, Art Unit 1736
DCM

/Stuart L. Hendrickson/
Primary Examiner, Art Unit 1736